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# Incorporating ePortfolios into Student Learning

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The process of job hunting for a student typically starts with preparation of a résumé that contains the student's degree and major, courses taken, and work-related experience. The résumé encapsulates the education that was defined by the institution and delivered to the student, but it does not always explain what the student actually learned from the courses. Neither does the résumé demonstrate the skill level of the student, nor the relationship between courses taken and other college experiences, such as study abroad programs, co-ops, internships, research experience, and community service. These intangibles can represent the student's most desirable qualities to a potential employer, but they are also the most difficult to express within the confines of a résumé.

Unlike other engineering programs, students in biosystems engineering (and similarly named programs) have the additional challenge of name recognition by employers of engineering graduates who are not familiar with the discipline. In fact, the most common question that BE students face during career fairs is: "I'm not familiar with your degree, so can you tell me more about biosystems engineering?" Embedded in this question—often to the students' dismay—is the expectation that students can effectively articulate their preparation for a specific career in biosystems engineering. The students are most persuasive when they have reflected on their learning experiences, can connect the courses in the curriculum, and can provide evidence of acquired skill sets. This

personal reflection and the collection of supporting material are two of the major elements of the ePortfolio, which facilitates students' ability to express the professional growth they experienced in college and explain why they are interested in a particular position with a particular employer.

## What's an ePortfolio?

An ePortfolio (short for electronic portfolio) is an organized collection of documents and media (called artifacts) in digitized format that are contextualized with the student's reflection on professional goals. An ePortfolio demonstrates a student's growth over time in skills, knowledge, and achievements. A well-designed ePortfolio gives prospective employers a complete sense of what the student is capable of. Personal reflection is the hardest part of developing an effective ePortfolio because it requires that students:

- Connect concepts from different courses and make connections between courses and extracurricular activities.
- Integrate, synthesize, and organize ideas from various sources.
- Think about and articulate significant experiences, both in and out of the classroom.
- Ask critical questions about their professional goals, progress towards these goals, and if need be develop new goals.

This personal reflection is also the most important part of developing an effective ePortfolio because it improves the

students' critical thinking, which is a useful skill for lifelong learning in any field.

A well prepared ePortfolio combines all the attributes of a social networking site (such as LinkedIn), a traditional paper-based portfolio, and a blog. Artifacts such as completed assignments, essays, project reports, videos, graphics, audio files, PowerPoint presentations, résumés, and professional and personal achievements can all be part of an ePortfolio. These artifacts enable students to document their professional development with metrics that are more informative, and more comprehensive, than course grades.

Historically, other academic programs, such as English, visual arts, and architecture, have used paper portfolios to demonstrate skill sets. However, traditional paper portfolios cannot be shared easily with remote audiences, they are difficult to duplicate, and they are limited in scope because they can't be easily modified for different purposes and diverse audiences.

In addition to overcoming the disadvantages of paper portfolios, ePortfolios can be used to assess student learning. They can also be used by faculty to share teaching philosophies and practices, to present department and program self-studies, and to satisfy institutional and program accreditation requirements. Because of their benefits, ePortfolios are becoming a common practice in professional programs such as nursing, pharmacy, medical school, and engineering.

The engineering programs at Virginia Tech, Montana State, Clemson, and the University of Texas-Austin, among others, have already introduced ePortfolios as part of the student learning experience. However, there is still a lack of sustained adoption of ePortfolios in these engineering programs, partly because ePortfolios have mostly been used for assessing program outcomes. It has therefore been difficult to manage the creation and evaluation of student ePortfolios, especially in large engineering programs. These challenges can be easily overcome in smaller engineering programs, such as biosystems engineering (and other engineering programs that may not be familiar to potential employers). As a result, ePortfolios can provide an effective means for students in these small programs to gain credibility with employers of engineering graduates.

### Auburn University and ePortfolios

In 2013, Auburn's Department of Biosystems Engineering received an ePortfolio grant from Auburn's
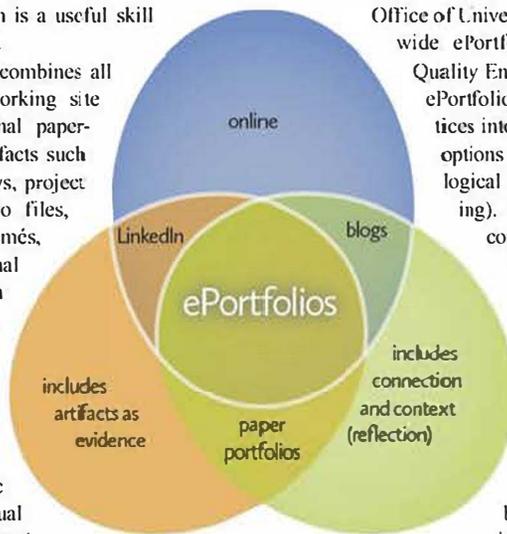


Attributes of ePortfolios. *Courtesy of Wende Garrison and Auburn University's Office of University Writing.*

Office of University Writing as part of the campus-wide ePortfolio Project and the university's Quality Enhancement Project. The goal of the ePortfolio grant is to embed reflection practices into the department's three curriculum options (i.e., biosystems engineering, ecological engineering, and forest engineering). The ePortfolio Project will also complement our efforts (through a USDA Higher Education Challenge grant awarded in 2012) to improve student learning and the employment prospects of BE students after graduation. The USDA grant is aimed at improving students' ability to integrate the concepts needed to solve complex, real-world, biology-based engineering problems while improving student learning, recruitment, and retention by using a hybrid pedagogical approach that combines a spiral curriculum with innovative hands-on investigation and multimedia case studies. Apart from the obvious benefits of using ePortfolios to promote reflective thinking and writing, we hope that ePortfolios will significantly improve the ability of BE students to articulate their technical competence, especially during a job search.

Three BE students were initially selected in fall of 2013 to work with Auburn's ePortfolio Project, through the Office of University Writing, to create ePortfolios that could be showcased to other BE students. Here are their comments on the experience (and links to their ePortfolios):



Students Sarah Ashworth, Zac Lee, and Anna Breland (left to right) participated in the ePortfolio Project in Auburn University's Department of Biosystems Engineering.

| Courses in Auburn's Department of Biosystems Engineering that will use ePortfolios | | |
|---|---|---|
| Course Code | Course Title | Location in Curriculum |
| ENGR 1110 | INTRODUCTION TO ENGINEERING | Fall/Spring Freshman |
| BSEN 2210 | ENGINEERING METHODS | Fall Sophomore |
| BSEN 2240* | HEAT AND MASS TRANSFER | Spring Sophomore |
| BSEN 3310* | HYDRAULIC TRANSPORT | Fall Junior |
| BSEN 3610 | INSTRUMENTATION AND CONTROLS | Spring Junior |
| BSEN 5220 | GEOSPATIAL TECHNOLOGIES | Fall Senior |
| BSEN 4300* | PROFESSIONAL PRACTICE IN BIOSYSTEMS | Fall Senior |
| BSEN 4310* | CAPSTONE DESIGN | Spring Senior |

*ePortfolios currently implemented

**Sarah Ashworth:** "The process of creating an ePortfolio helped me figure out who I am as a person and who I want to be as a professional. I now have a unique way to show people what makes me me and what I have learned in school" (http://skashworth.weebly.com).

**Zac Lee:** "The Auburn ePortfolio Project allowed me to use a new form of media to learn more about myself, better explain who I am, and share my experiences as a biosystems engineer" (http://zacharyscottlee.weebly.com).

**Anna Breland:** "The ePortfolio experience allowed me the opportunity to look back at my college courses and identify tangible skills that I have to offer employers" (http://annabreland.weebly.com).

Based on this initial success, we have extended the incorporation of ePortfolios in several of the courses (asterisks in the table above, representing ~60% of the student population) in Auburn's Department of Biosystems Engineering. Our long-term goal is to incorporate ePorfolios in all of the courses listed in the table. In each of these courses, ePortfolio-related assignments have been developed that at the minimum require students to collect artifacts related to the course and reflect on their collected artifacts by incorporating (1) the new competencies that they acquired in the course, (2) competencies that they learned in previous courses and then related to the current course, (3) competencies that they think they lack, and should acquire before graduation, in relation to a particular assignment, and (4) an overall reflection on their learning experience at this stage in the curriculum.

We also anticipate that by the time students are in the capstone design course, which is when they typically attend the career fair, they will have collected sufficient artifacts and reflections on their learning, through their ePortfolios, to be able to articulate their learning experience and their overall competence. Ultimately, we expect that ePortfolios will lead to a better learning experience for undergraduate BE students, including improvements in their communication skills,

critical reflection, visual literacy, and technical competency. Most important, the students will learn how to provide evidence of their abilities to potential employers—because it's not enough to know something; you have to be able to show it. Initial evidence from the 2014-2015 graduating class indeed shows that this is the case. A higher percentage of the graduating students were invited for employer interviews before graduation, and their ePorfolios were part of the reason these students were interviewed.

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**Further reading**

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In addition, software platforms for designing ePortfolios are freely available from Auburn University's Office of University Writing: http://wp.auburn.edu/writing/eport-folio-project/.